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PCIPS 2.0: POWERFUL MULTIPROFILE IMAGE PROCESSING IMPLEMENTED ON PCs

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Over the years, the processing power of personal computers has steadily increased. Now, 386- and 486-based PCs are fast enough for many image processing applications, and inexpensive enough even for amateur astronomers. PCIPS is an image processing system based on these platforms that was designed to satisfy a broad range of data analysis needs, while requiring minimum hardware and providing maximum expandability. It will run (albeit at a slow pace) even on a 80286 with 640K memory, but will take full advantage of bigger memory and faster CPUs. Because the actual image processing is performed by external modules, the system can be easily upgraded by the user for all sorts of scientific data analysis.

PCIPS supports large format 1D and 2D images in any numeric type from 8-bit integer to 64-bit floating point. The images can be displayed, overlaid, printed and any part of the data examined via an intuitive graphical user interface that employs buttons, pop-up menus, and a mouse. PCIPS automatically converts images between different types and sizes to satisfy the requirements of various applications.

PCIPS features an API that lets users develop custom applications in C or FORTRAN. While doing so, a programmer can concentrate on the actual data processing, because PCIPS assumes responsibility for accessing images and interacting with the user. This also ensures that all applications, even custom ones, have a consistent and user-friendly interface. The API is compatible with *factory programming*, a metaphor for constructing image processing procedures that will be implemented in future versions of the system (see Smirnov, Piskunov this conference).

Several application packages were created under PCIPS. The basic package includes elementary arithmetics and statistics, geometric transformations and import/export in various formats (FITS, binary, ASCII, GIF). The CCD processing package and the spectral analysis package were successfully used to reduce spectra from the Nordic Telescope at La Palma. A photometry package is also available, and other packages are being developed.

A multitasking version of PCIPS that utilizes the factory programming concept is currently under development. This version will remain compatible (on the source code level) with existing application packages and custom applications.